There are too many process related defects in the sub-assembly of the 53X. The type of defects are as shown below:

- Missing Components
- Improper Mounted Components
- Reverse Components
- Damaged Components
- Contact Machine
- Machine Insertion
- 2nd Hand Assembly
- Manual Assembly

The types of defects.

The processes involved are:
A large number of process assembly defects leads to increased screening and repairs. Which can cause the manufacturing costs to rise and the outgoing Quality levels to deteriorate.

By optimizing our processes we can increase Customer Satisfaction.

THEME

IMPROVE THE ASSEMBLY OF
THE 53X UNIT.
The Factory Data Collection System is an excellent source for process data. It is based on 100% testing and enables us to analyze the data from many perspectives.

Process Assembly Defects

INDICATOR
OUR INDICATOR WILL BE THE NUMBER OF PROCESS ASSEMBLY DEFECTS REPORTED IN THE SYSTEM.
Next, we stratified the data to determine which assembly defects occurred most often.

Distribution of Defects - 1991

Improperly mounted and wrong were the most significant. The probable root causes for wrong were more generic and we determined that it would be worthwhile to address this issue first.
CURRENT SITUATION

Further stratification was done to determine the process that was contributing most to the wrong component type defects.

WRONG COMPONENTS
BY PROCESS
4TH QTR

The recent data showed that manual assembly was where we needed to concentrate our efforts.

PROBLEM STATEMENT:
During the fourth quarter, 50% of the wrong component type defects were due to the manual assembly process.

TARGET:
Elimination of these wrong component defects by 1st QTR next year.
The team discussed each root cause and analyzed the root causes of wrong components over a period of one month. For every wrong part found by the system we investigated for the root cause.

Some of the things we did to verify the root causes were:

- We talked to the operator who was responsible for inserting that part
- We talked to the tester to determine what part was used instead of the right one
- We talked to the operator who makes repairs
- We looked in the kanbans for mixed parts
- We learned that in most cases the parts were mixed

In a few instances we found that:
During repair the operator inserted the wrong part.
A operator was given the wrong tray of a similar looking part.
One operator swapped two similar parts with same hole span.

Our investigation showed that most of the defects were attributed to the operators receiving wrong or mixed parts, rather than the operators inserting at the wrong location.

Therefore, our countermeasures are geared toward development of a system that enables the operators to receive correct and unmixed parts.
ANALYSIS

MIXED COMPONENTS AT MFG. STORAGE
/IMPROPER STORAGE SYSTEM
1. Unlabeled bins in kanbans.
2. Labels not visible.
3. Similar components stored next to each other.
4. People returning parts to wrong place.
5. Dropped parts returned to wrong place.

MIXED COMPONENTS AT PERFORM PROCESS
1. Similar components preformed at same location.
2. Trays with no labels.
3. Operators start on a different part without removing all of the previous part.

WRONG TRAY
1. Unlabeled trays/bins
2. Operators not verifying labels before using trays.

IMPROPER ASSEMBLY PROCEDURES
1. Similar looking components inserted at same locations.
2. Components with the same hole span inserted at the same position.

WRONG COMPONENT USED AT REPAIR
1. Poor training
2. Not verifying part.
3. Not reading documentation

INATTENTION
1. Operators not verifying trays.
2. Operators not verifying parts.
3. Operators interchanging components.
<table>
<thead>
<tr>
<th>ROOT CAUSE</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed component at Mfg. storage</td>
<td>Put visible labels on trays and bin. Separate similar components. Create procedure to verify labels. Red bins for dropped parts.</td>
</tr>
<tr>
<td>Mixed components at preform</td>
<td>Label all trays Clean off work area between jobs</td>
</tr>
<tr>
<td>Wrong Tray</td>
<td>Use only labeled trays and bins Create procedure for verifying labels</td>
</tr>
<tr>
<td>Improper assembly procedures</td>
<td>Redistribute parts in the manual assembly process so that similar parts are not at the same position. Redistribute parts so that parts with the same hole span are not at the same position.</td>
</tr>
<tr>
<td>Wrong components at repair</td>
<td>Implement procedure to verify correct component at repair.</td>
</tr>
<tr>
<td>Inattention</td>
<td>Implement process to track defect to the operator level and provide feedback.</td>
</tr>
</tbody>
</table>
## ACTION PLAN

<table>
<thead>
<tr>
<th>COUNTERMEASURES</th>
<th>BARRIERS</th>
<th>AIDS</th>
<th>WHAT?</th>
<th>WHO?</th>
<th>WHEN?</th>
<th>HOW?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Put visible labels on trays and bins.</td>
<td>Available manpower</td>
<td>None</td>
<td>Make and apply labels on every bin &amp; tray.</td>
<td>AL Strong</td>
<td>2/92</td>
<td></td>
</tr>
<tr>
<td>Separate similar components</td>
<td>Available manpower</td>
<td>None</td>
<td>Operators rearrange parts.</td>
<td>AL Strong</td>
<td>2/92</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not enough cabinets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verify Labels</td>
<td>Resistance to change</td>
<td>None</td>
<td>Procedure &amp; training</td>
<td>AL Strong</td>
<td>2/92</td>
<td>Procedure</td>
</tr>
<tr>
<td>Use Red Bins</td>
<td>Resistance to change</td>
<td>None</td>
<td>Put parts found on the floor(etc) in red bins.</td>
<td>AL Strong</td>
<td>2/92</td>
<td>Procedure</td>
</tr>
<tr>
<td>Use only labeled bins</td>
<td>Resistance to change</td>
<td>None</td>
<td>Procedure &amp; training</td>
<td>AL Strong</td>
<td>2/92</td>
<td>Procedure</td>
</tr>
<tr>
<td>Clean off work area between jobs.</td>
<td>Resistance to change</td>
<td>None</td>
<td>Procedure &amp; training</td>
<td>AL Strong</td>
<td>2/92</td>
<td>Procedure</td>
</tr>
<tr>
<td>Redistribute parts in the manual assembly process.</td>
<td>Limited workstations Updating</td>
<td>None</td>
<td></td>
<td>AL Strong</td>
<td>3/92</td>
<td></td>
</tr>
<tr>
<td>Verify component at repair</td>
<td>Available manpower</td>
<td>None</td>
<td></td>
<td>AL Strong</td>
<td>2/92</td>
<td></td>
</tr>
<tr>
<td>Track data to operator level &amp; provide feedback.</td>
<td>Available manpower</td>
<td>None</td>
<td></td>
<td>AL Strong</td>
<td>2/92</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resistance to change</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
RESULTS

Wrong Component Defects

PROCESS DEFECTS
MANUAL ASSEMBLY

PROCESS DEFECTS PER/1000
MANUAL ASSEMBLY
Wrong Component Defects

PROCESS DEFECTS
MANUAL ASSEMBLY - MACHINE INSERTION - CONTACT MACHINE

PROCESS DEFECTS PER/1000
MANUAL ASSEMBLY - MACHINE INSERTION - CONTACT MACHINE
When new codes are introduced for production the following questions have been added to the checklist.

1. Does the distribution and storage of parts keep similar looking parts separate.
2. Does the distribution and storage of parts keep parts with the same hole span apart.
3. Have trays & bins been labeled for all new components.
OLD FLOW

Parts delivered

Shop unpacked parts

Add bins anywhere or use any empty ones

Store Parts

NEW FLOW

Parts delivered

Shop uses procedure to receive parts

is checklist criteria met

NO

Yes

Store Parts
• MEET WITH REPRESENTATIVES FROM OTHER MANUFACTURING SHOPS THAT HAVE MANUAL ASSEMBLY TO SHARE INFORMATION.

• ATTACK NEXT DEFECT TYPE
A problem well-posed
is half-solved.

John Dewey